Technical Note

Scope of the survey

The Occupational Employment Statistics (OES) survey is a semiannual mail survey measuring occupational employment and wage rates for wage and salary workers in nonfarm establishments, by industry, in the United States. (Guam, Puerto Rico, and the Virgin Islands also are surveyed, but their data are not included in this release.) In 2002, the OES survey switched from industry coding based on the Standard Industrial Classification (SIC) system to that based on the North American Industry Classification System (NAICS). The nationwide response rate for the May 2003 survey was 79 percent for establishments, covering 72 percent of weighted employment.

In November 2002, the OES survey changed from an annual survey of 400,000 establishments to a semiannual survey of 200,000 establishments. The OES survey samples and contacts establishments in May and November of each year and, over 3 years, contacts approximately 1.2 million establishments. The full 3-year sample allows the production of estimates at fine levels of geographic, industrial, and occupational detail.

In order to maintain adequate geographic, industrial, and occupational coverage through the implementation of NAICS and semiannual sampling, May 2003 data were combined with samples from November 2002, 2001, 2000, and a subset of certainty units collected in 1999. Note that May 2003 and November 2002 are semiannual samples while 2001 and 2000 are annual samples. Data from 1999 were added to provide complete coverage of the certainty strata. The total sample size is 1.2 million establishments. Estimates from the OES survey are based on data collected using the Standard Occupational Classification (SOC) system. A brief description of this classification system is provided below.

The Standard Occupational Classification system

In 1999, the OES survey began using the Office of Management and Budget's (OMB) occupational classification system, the Standard Occupational Classification (SOC) system. The SOC system is the first OMB-required occupational classification system for federal agencies. The OES survey categorizes workers in 1 of the 770 detailed occupations. Together, these detailed occupations comprise 23 major occupational groups. The major groups are as follows:

Management occupations
Business and financial operations occupations
Computer and mathematical science occupations
Architecture and engineering occupations
Life, physical, and social science occupations
Community and social services occupations
Legal occupations
Education, training, and library occupations
Arts, design, entertainment, sports, and media occupations
Healthcare practitioner and technical occupations
Healthcare support occupations
Protective service occupations
Food preparation and serving related occupations
Building and grounds cleaning and maintenance occupations
Personal care and service occupations
Sales and related occupations
Office and administrative support occupations
Farming, fishing, and forestry occupations
Construction and extraction occupations
Installation, maintenance, and repair occupations
Production occupations
Transportation and material moving occupations
Military specific occupations (not surveyed in OES).

For more information about the SOC system, please see the Bureau of Labor Statistics (BLS) Web site at http://www.bls.gov/soc.

The industry coding system

As noted earlier, in 2002, the OES survey switched from using the Standard Industrial Classification (SIC) system to using the North American Industry Classification System (NAICS). For more information about NAICS, see the BLS Web site at http://www.bls.gov/bls/naics.htm.

The OES survey includes establishments in NAICS sectors 11 (logging and agricultural support activities only), 21, 22, 23, 31-33, 42, 44-45, 48-49, 51, 52, 53, 54, 55, 56, 61, 62, 71, 72, 81 (except private households), state government, and local government. Data for the U.S. Postal Service and the federal government are universe counts obtained from the Postal Service and the Office of Personnel Management, respectively. An establishment is defined as an economic unit that processes goods or provides services, such as a factory, mine, or store. The establishment is generally at a single physical location and is engaged primarily in one type of economic activity.

The OES survey covers all full- and part-time wage and salary workers in nonfarm industries. The survey does not include the self-employed owners and partners in unincorporated firms, household workers, or unpaid family workers.

Survey coverage

BLS funds the survey and provides the procedures and technical support, while the State Workforce Agencies (SWAs) collect the data. BLS produces cross-industry NAICS estimates for the nation, states, and metropolitan statistical areas (MSAs). NAICS estimates are produced for 3-digit, 4-digit, and selected 5-digit industry levels. BLS releases all cross-industry and national estimates, and the SWAs release industry estimates at the state and MSA levels.

State Unemployment Insurance (UI) files provide the universe from which the OES survey draws its sample. The employment benchmarks are obtained from reports submitted by employers to the UI program. Supplemental sources are used for rail transportation (NAICS 4821) and Guam because they do not report to the UI program. The OES survey sample is stratified by area, industry, and size class. Size classes are defined as follows:

Size class	Number of employees
1	1 to 4
2	5 to 9
3	10 to 19
4	20 to 49
5	50 to 99
6	100 to 249
7	250 and above

UI reporting units with 250 or more employees are sampled with virtual certainty across a 3-year period. Generally, one-sixth of the certainty units are sampled in each panel in each state. Some states, however, sampled more than one-sixth of their certainty units in the May 2003 survey to make up for a shortfall in a previous sample.

Concepts

Occupational employment is the estimate of total wage and salary employment in an occupation across the industries in which that

occupation was reported. The OES survey defines employment as the number of workers who can be classified as full-time or part-time employees, including workers on paid vacations or other types of leave; workers on unpaid short-term absences; salaried officers, executives, and staff members of incorporated firms; employees temporarily assigned to other units; and employees for whom the reporting unit is their permanent duty station regardless of whether that unit prepares their paycheck.

The OES survey form sent to an establishment contains between 50 and 225 SOC occupations selected on the basis of the sampled establishment's industry classification and size class. To reduce paperwork and respondent burden, no survey form contains every SOC occupation. Thus, data for specific occupations are collected primarily from establishments in industries that are the predominant employers of workers in those occupations. Each survey form is structured, however, to allow a respondent to provide detailed occupational information for each worker at the establishment; that is, unlisted occupations can be added to the survey form.

Wages for the OES survey are straight-time, gross pay, exclusive of premium pay. Base rate, cost-of-living allowances, guaranteed pay, hazardous-duty pay, incentive pay including commissions and production bonuses, tips, and on-call pay are included. Excluded are back pay, jury duty pay, overtime pay, severance pay, shift differentials, non-production bonuses, employer cost for supplementary benefits, and tuition reimbursements.

The OES survey collects wage data in 12 intervals. Employers report the number of employees in an occupation for each wage range. The wage intervals used for the May 2003 survey are as follows:

Interval	Wages	
	Hourly	Annual
Range A	Under $6.75	Under $14,040
Range B	$6.75 to $8.49	$14,040 to $17,679
Range C	$8.50 to $10.74	$17,680 to $22,359
Range D	$10.75 to $13.49	$22,360 to $28,079
Range E	$13.50 to $16.99	$28,080 to $35,359
Range F	$17.00 to $21.49	$35,360 to $44,719
Range G	$21.50 to $27.24	$44,720 to $56,679
Range H	$27.25 to $34.49	$56,680 to $71,759
Range I	$34.50 to $43.74	$71,760 to $90,999
Range J	$43.75 to $55.49	$91,000 to $115,439
Range K	$55.50 to $69.99	$115,440 to $145,599
Range L	$70.00 and over	$145,600 and over

Mean hourly wage. The mean hourly wage rate for an occupation is the total wages that all workers in the occupation earn in an hour divided by the total employment of the occupation. To calculate the mean hourly wage of each occupation, total weighted hourly wages are summed across all intervals and divided by the occupation's weighted survey employment. The mean wage for each interval is based on occupational wage data collected by the BLS Office of Compensation and Working Conditions for the National Compensation Survey (NCS).

The mean hourly wage value for the highest wage interval, $70.00 and over, is calculated after excluding data for pilots. Pilots comprise a large portion of the employment from the NCS that falls into the highest interval, and about one percent of the workers reported for the OES survey makes $70.00 and over. Since pilots work fewer hours than workers in other occupations, their hourly wage rates are much higher than other occupations. After excluding pilots from the calculation, the mean wage rate for the highest interval was computed separately for May 2003, November 2002, 2001, 2000, and 1999. Then the average of these five mean wage rates was derived and used for all of the $70.00 and over data in the May 2003 survey. The wage rates for this interval do not go through any wage updating procedures.

Percentile wage. The p-th percentile wage range for an occupation is the wage where p percent of all workers earn that amount or less and where (100-p) percent of all workers earn that amount or more. This statistic is calculated by uniformly distributing the workers inside each wage interval, ranking the workers from lowest paid to highest paid, and calculating the product of the total employment for the occupation and the desired percentile to determine the worker that earns the p-th percentile wage rate.

Annual wage. Many employees are paid at an hourly rate by their employers and may work more than or less than 40 hours per week. Annual wage estimates in this release are calculated by multiplying the mean hourly wage by a "year-round, full-time" figure of 2,080 hours (52 weeks by 40 hours). Thus, annual wage estimates may not represent the actual annual pay received by the employee if they work more or less than 2,080 hours per year. Alternatively, some workers are paid based on an annual amount, but they generally do not work the usual 2,080 hours per year. Since the OES survey does not collect the actual number of hours worked, hourly rates cannot be calculated with a reasonable degree of confidence from annual rates. For this reason, the annual salary is directly calculated from reported survey data, and only annual wages are estimated for these occupations. Occupations that typically have a work year of less than 2,080 hours include musical and entertainment occupations, pilots and flight attendants, and teachers.

Hourly versus annual wage reporting. For each occupation, respondents are asked to report the number of employees paid within specific wage intervals. The intervals are defined both as hourly rates and the corresponding annual rates, where the annual rate for an occupation is calculated by multiplying the hourly wage rate by a typical work year of 2,080 hours. The responding establishment can reference either the hourly or the annual rate, but they are instructed to report the hourly rate for part-time workers.

Estimation methodology

Beginning in November 2002, the OES survey samples approximately 200,000 establishments semiannually in November and May of each year, for a combined sample of 1.2 million different establishments over six semiannual panels. Until 2002, the survey sampled approximately 400,000 establishments in the fourth quarter of each year, for a 3-year combined sample size of 1.2 million. While estimates can be made from a single year or 2 years of data, the OES survey has been designed to produce estimates at a desired level of precision using the full 3 years, or 6 panels, of data. The 3-year sample allows the production of estimates at fine levels of geographic, industrial, and occupational detail.

Producing estimates using the 3 years of sample data provides significant sampling error reductions (particularly for small geographic areas and occupations); however, it also has some quality limitations in that it requires the adjustment of earlier year's data to the current reference period, a procedure referred to as "wage updating."

Wage updating. As noted above, combining multiple years of data has both statistical advantages and limitations. Significant reductions in sampling error can be achieved by taking advantage of 3 years of

data, which covers over 70 percent of the employment in the United States. This feature is particularly important in improving the reliability of estimates for small domains in the population (that is, wage and employment estimates for detailed occupations in small areas). Combining multiple years of data also has been necessary to obtain full coverage of establishments with 250 or more workers that are sampled with certainty.

Starting with the 1997 estimates, the OES program has used the BLS Employment Cost Index (ECI) to adjust survey data from prior years or panels before combining them with the current panel's data. The wage updating procedure assumes that each occupation's wage rate, as measured in the earlier year or panel, moves according to the average movement of the broader occupational division that encompasses it and that there are no major geographic, industrial, or detailed occupational differences.

May 2003 OES survey estimates. The May 2003 OES survey estimates are based on data collected from establishments in the November 2002, 2001, and 2000 samples plus a subset of certainty units collected in 1999. The May 2003 estimates used the wage-updating methodology introduced in 1997. In addition, a "nearest neighbor" hot deck imputation procedure was used to impute occupational employment totals for establishments that reported no employment data. For establishments that reported (or imputed) occupational employment totals but did not report an employment distribution across the wage intervals, a variation of mean imputation was used to impute the distribution. During estimates processing, OES employment data were benchmarked to the average employment for May 2003 and November 2002 from the BLS Quarterly Census of Employment and Wages.

Reliability of the estimates. Estimates calculated from a sample survey are subject to two types of error: sampling and nonsampling. *Sampling error* occurs when estimates are calculated from a subset (i.e., sample) of the population instead of the full population. When a sample of the population is surveyed, there is a chance that the sample estimate of the characteristic of interest may differ from the population value of that characteristic. Differences between the sample estimate and the population value will vary depending on the sample selected. This variability can be estimated by calculating the standard error (SE) of the sample estimate. If we were to repeat the sampling and estimation process countless times using the same survey design, approximately 90 percent of the intervals created by adding and subtracting 1.645 SEs from the sample estimate would include the population value. These intervals are called 90-percent confidence intervals. The OES survey, however, usually uses the relative standard error (RSE) of a sample estimate instead of its SE to measure sampling error. RSE is defined as the SE of a sample estimate divided by the sample estimate itself. This statistic provides the user with a measure of the relative precision of the sample estimate. RSEs are calculated for both occupational employment and mean wage rate estimates. Occupational employment RSEs are calculated using a subsample, random group replication technique called the Jackknife. Mean wage rate RSEs are calculated using a variance components model that accounts for both the observed and unobserved components of the wage data. The variances of the unobserved components are estimated using wage data from the BLS National Compensation Survey. In general, estimates based on many establishments have lower RSEs than estimates based on few establishments. If the distributional assumptions of the models are violated, the resulting confidence intervals may not reflect the prescribed level of confidence.

Nonsampling error occurs for a variety of reasons, none of which are directly connected to sampling. Examples of nonsampling error include: nonresponse, data incorrectly reported by the respondent, mistakes made in entering collected data into the database, and mistakes made in editing and processing the collected data.

Additional information

The May 2003 OES national data by occupation, comparable to data in table 1, will be available soon on the Internet (http://www.bls.gov/oes). Users also may access each occupation's definition and percentile wages. The May 2003 cross-industry data for states and metropolitan areas will be available on the BLS Web site in early May. Industry staffing patterns at the 3-, 4-, and selected 5-digit NAICS levels also will be available from the Internet beginning in early May. These data will include industry-specific occupational employment and wage data.

For additional information, contact the Office of Employment and Unemployment Statistics, Division of Occupational Employment Statistics, Room 2135, 2 Massachusetts Avenue, NE, Washington, DC, 20212; telephone 202-691-6569 (e-mail: oesinfo@bls.gov).

Information in this release will be made available to sensory impaired individuals upon request. Voice phone: 202-691-5200; TDD message referral phone number: 1-800-877-8339.